

Candidate Name _____

Centre Number

Candidate
Number

--	--

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

**Joint Examination for the School Certificate
and General Certificate of Education Ordinary Level**

SCIENCE

5125/4, 5126/4

PAPER 4 Biology

OCTOBER/NOVEMBER SESSION 2001

1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

Section A

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Section B

Answer any **two** questions.

Write your answers on the separate answer paper provided.

At the end of the examination,

1. fasten all separate answer paper securely to the question paper;
2. enter the numbers of the **Section B** questions you have answered in the left-hand column of the grid below.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [] at the end of each question or part question.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 12 printed pages.

Section A

Answer **all** the questions.

- 1 (a) Place a tick in the correct box of Fig. 1.1 to indicate whether each human feature shows continuous or discontinuous variation.

human feature	continuous	discontinuous
eye colour		
hair colour		
height		
weight		
width of hand		

Fig. 1.1

[3]

- (b) From Fig. 1.1, name **one** variation which is controlled entirely by inheritance and is **not** affected by environmental factors.

.....[1]

- 2 A student looked at cells on an unlabelled slide, using a microscope.

The cells are shown in Fig. 2.1

Parts of the cells are labelled **A** to **F**.

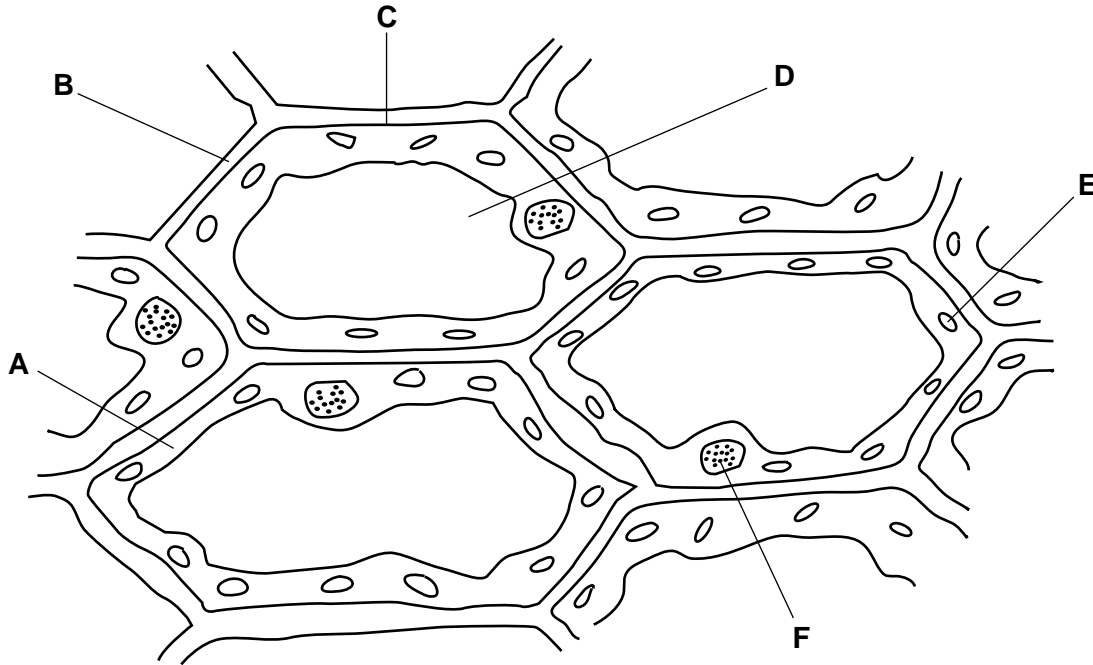


Fig. 2.1

- (a) Complete the table in Fig. 2.2. Write the correct letter from Fig. 2.1 next to each part of the cell. The first one has been done for you.

part of cell	letter
cell membrane	C
cell wall	
cytoplasm	
chloroplast	
nucleus	
vacuole	

Fig. 2.2

[5]

(b) The student identified these cells as plant cells.

Suggest two observations that led the student to make this identification.

1.
2.[2]

3 The table in Fig. 3.1 gives details of the lifestyle of two men, X and Y, of average height.

	man X	man Y
age in years	25	55
body mass in kilograms	52	85
cigarettes smoked per day	0	20
fat eaten per day in grams	70	120

Fig. 3.1

(a) (i) Tick **one** box in Fig. 3.2 to show which man is at greater risk from coronary heart disease.

man X is at greater risk	
man Y is at greater risk	
they are equally at risk	

Fig. 3.2

[1]

(ii) Describe coronary heart disease.

-
-
-[2]

(b) Suggest two things that a man can do to reduce the risk of having a heart attack.

1.
2.[2]

(c) A healthy diet includes an adequate intake of water each day.

Suggest two uses of water in the body.

1.

2.[2]

- 4 A student cut identical pieces of potato and measured how their mass changed when they were soaked in sucrose solutions of different concentrations.

Her results are shown in the table in Fig. 4.1.

sucrose concentration / mol per dm ³	mass of potato piece / g		change in mass / g
	before soaking	after soaking	
0.0	5.00	5.59	+ 0.59
0.2	5.00	5.35	+ 0.35
0.4	5.00	4.91	- 0.09
0.6	5.00	4.85	- 0.15
0.8	5.00	4.62	- 0.38

Fig. 4.1

- (a) Use the grid in Fig. 4.2 to plot change in mass against sucrose concentration.

Draw the line of best fit.

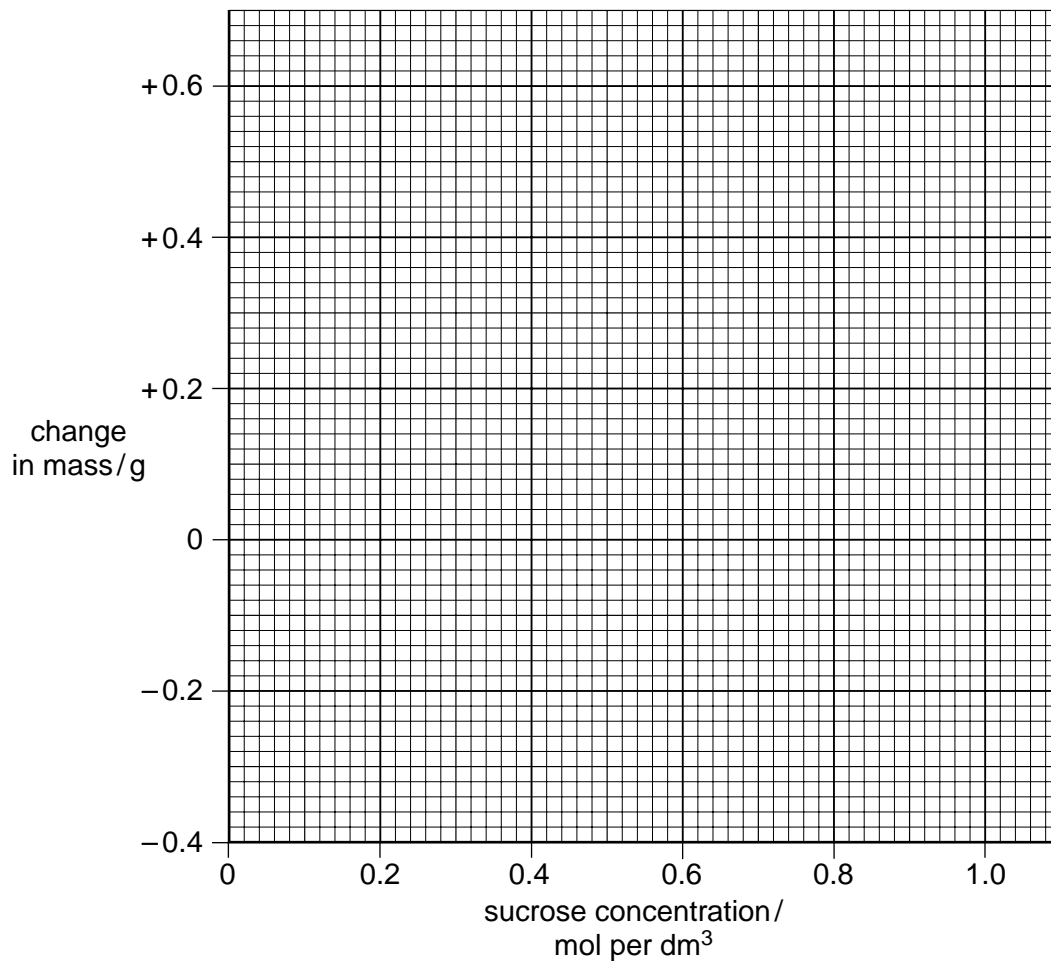


Fig. 4.2

[3]

(b) (i) Name the process that causes the change in mass.

.....[1]

(ii) Explain why some of the potato pieces gained mass but others lost mass.

.....
.....
.....
.....
.....[4]

(c) Use your graph to find the concentration of sucrose solution at which the mass of the potato stays the same.

.....[1]

5 Briefly describe the source and an effect of each of the following pollutants.

(a) sulphur dioxide

source

effect

.....[2]

(b) sewage

source

effect

.....[2]

(c) insecticides

source

effect

.....[2]

6 (a) Fig. 6.1 shows a section through a seed.

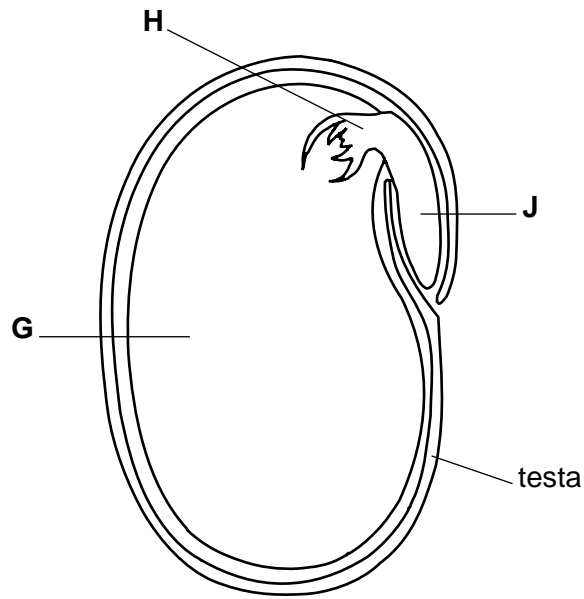


Fig. 6.1

(i) Name parts **G**, **H** and **J**.

G

H

J

[3]

(ii) What is the function of the testa?

.....

.....[1]

(b) Seeds are contained in fruits.

Fig.6.2 shows two types of fruit, **L** and **M**, one dispersed by animals and one dispersed by the wind.

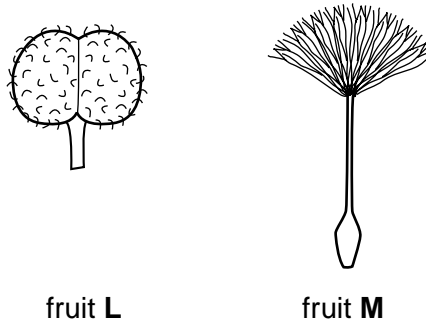


Fig. 6.2

Suggest, with reasons, how fruits **L** and **M** are dispersed.

fruit **L**

reason

.....

fruit **M**

reason

.....[3]

(c) Fig. 6.3 shows the patterns of fruit dispersal around two plants, **X** and **Y**, each within a circular area of radius 30 m.

Each dot represents one fruit.

The fruits of one plant are dispersed by animals and the fruits of the other plant are dispersed by the wind.

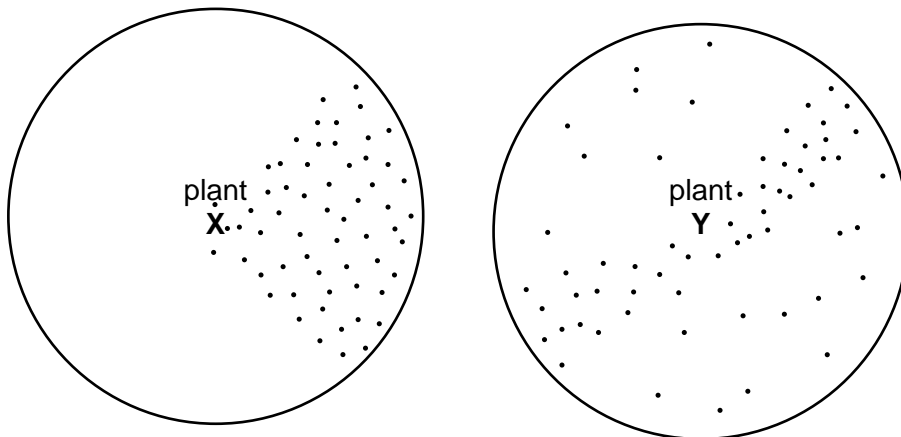


Fig. 6.3

Suggest and explain which plant has fruits dispersed by animals and which by the wind.

.....
.....
.....
.....
.....[3]

(d) In plants, seeds are produced by sexual reproduction.

(i) What is meant by the term *sexual reproduction*?

.....
.....[1]

(ii) Give **one** difference between sexual reproduction and asexual reproduction.

.....
.....[1]

Section B

Answer any **two** questions.

Write your answers on the separate answer paper provided.

- 7 A man exercised on a running machine. His average pulse rate was measured at different speeds of the machine. Each pulse results from one beat of the heart pumping blood through the arteries. The results are shown in the table in Fig. 7.1.

speed of running machine / km per hour	pulse rate per minute
0	70
4	88
6	96
8	112
10	129

Fig. 7.1

- (a) Explain why the pulse rate changed as the speed of the machine was increased. [5]
- (b) Describe and explain how the man's breathing changes during this exercise. [5]
- 8 (a) (i) Describe how the teeth help in the digestion of food. [2]
(ii) What are the causes of dental decay, and how can this decay be prevented? [3]
- (b) (i) Define the process of *excretion*. [2]
(ii) Describe how carbon dioxide, water and urea are excreted from the human body. [3]
- 9 (a) Draw a diagram to represent the carbon cycle. Include in your diagram the processes of photosynthesis, animal nutrition, respiration and combustion. [4]
- (b) (i) Explain how the carbon cycle has maintained a constant proportion of carbon dioxide in the air for thousands of years. [4]
(ii) Suggest how and why the proportion of carbon dioxide in the air has changed during the past hundred years. [2]